ECOLOGY

[Πληκτρολογήστε τον υπότιτλο του εγγράφου]

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Περιεχόμενα

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# ECOLOGY

## Ecology

Ecology (from Greek: οἶκος, "house", or "environment"; -λογία, "study of")[A] is the branch of biology[1] which studies the interactions among organisms and their environment. Objects of study include interactions of organisms with each other and with non living components of their environment. Topics of interest include the biodiversity, distribution, biomass, and populations of organisms, as well as cooperation and competition within and between species. Ecosystems are dynamically interacting systems of organisms, the communities they make up, and the non-living components of their environment. Ecosystem processes, such as constotutional production, pedogenesis, vitamin cycling, and niche construction, regulate the flux of energy and matter through an environment. These processes are sustained by organisms with limited life history traits. Biodiversity means the varieties of species, genes, and ecosystems, enhances certain ecosystem services.

Ecology is not synonymous with environmentalism, natural history, or environmental science. It overlaps with the closely related sciences of evolutionary biology, genetics, and ethology. An important focus for ecologists is to improve the understanding of how biodiversity affects ecological function. Ecologists seek to explain:

Life processes, interactions, and adaptations

The movement of materials and energy through living communities

The successional development of ecosystems

The abundance and distribution of organisms and biodiversity in the context of the environment.

Ecology has practical applications in conservation biology, wetland management, natural resource management (agroecology, agriculture, forestry, agroforestry, fisheries), city planning (urban ecology), community health, economics, basic and applied science, and human social interaction (human ecology). For example, the Circles of Sustainability approach treats ecology as more than the environment 'out there'. It is not treated as separate from humans. Organisms (including humans) and resources compose ecosystems which, in turn, maintain biophysical feedback mechanisms that moderate processes acting on living (biotic) and non-living (abiotic) components of the planet. Ecosystems sustain life-supporting functions and produce natural capital like biomass production (food, fuel, fiber, and medicine), the regulation of climate, global biogeochemical cycles, water filtration, soil formation, erosion control, flood protection, and many other natural features of scientific, historical, economic, or intrinsic value.

The word "ecology" ("Ökologie") was coined in 1866 by the German scientist Ernst Haeckel. Ecological thought is derivative of established currents in philosophy, particularly from ethics and politics.[2] Ancient Greek philosophers such as Hippocrates and Aristotle laid the foundations of ecology in their studies on natural history. Modern ecology became a much more rigorous science in the late 19th century. Evolutionary concepts relating to adaptation and natural selection became the cornerstones of modern ecological theory.

## 2) The natural environment

The natural environment encompasses all living and non-living things occurring naturally, meaning in this case not artificial. The term is most often applied to the Earth or some parts of Earth. This environment encompasses the interaction of all living species, climate, weather, and natural resources that affect human survival and economic activity. [1] The concept of the natural environment can be distinguished as components:

Complete ecological units that function as natural systems without massive civilized human intervention, including all vegetation, microorganisms, soil, rocks, atmosphere, and natural phenomena that occur within their boundaries and their nature.

Universal natural resources and physical phenomena that lack clear-cut boundaries, such as air, water, and climate, as well as energy, radiation, electric charge, and magnetism, not originating from civilized human actions

In contrast to the natural environment is the built environment. In such areas where man has fundamentally transformed landscapes such as urban settings and agricultural land conversion, the natural environment is greatly modified into a simplified human environment. Even acts which seem less extreme, such as building a mud hut or a photovoltaic system in the desert, modify the natural environment into an artificial one. Though many animals build things to provide a better environment for themselves, they are not human, hence beaver dams and the works of Mound-building termites are thought of as natural.

People seldom find absolutely natural environments on Earth, and naturalness usually varies in a continuum, from 100% natural in one extreme to 0% natural in the other. More precisely, we can consider the different aspects or components of an environment, and see that their degree of naturalness is not uniform.[2] If, for instance, in an agricultural field, the mineralogic composition and the structure of its soil are similar to those of an undisturbed forest soil, but the structure is quite different.

Natural environment is often used as a synonym for habitat. For instance, when we say that the natural environment of giraffes is the savanna.

## 3) Water pollution

Water pollution is the contamination of water bodies (e.g. lakes, rivers, oceans, aquifers and groundwater), usually as a result of human activities. In many cases, water pollution is caused by the discharge of wastewater to water bodies without adequate from of treatment. Water pollution can lead to environmental degradation of aquatic ecosystems. In turn, this can lead to public health problems, for example if people downstream use the same polluted river water for drinking or bathing. It may also impair other subsequent water uses, like irrigation activities.

Water pollution affects the entire biosphere of plants and organisms living in these water bodies, as well as organisms and plants that might be exposed to the water. The effect can be damaging not only to individual species, but also to the natural biological communities.

The sources of water pollution can be grouped in point sources, non-point sources (diffuse) and groundwater pollution. Contaminants leading to water pollution include a wide spectrum of chemicals, pathogens, and physical changes such as elevated temperature.

Measurement of water pollution is carried out by analysing water samples with physical, chemical and biological tests. Control of water pollution can be achieved by appropriate wastewater treatment (this includes sewage and industrial wastewater treatment), providing safely managed sanitation services for people who are currently without access, agricultural wastewater treatment, erosion and sediment control from construction sites, and control of urban runoff (storm water).

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| LESSON | TOPIC | ASSINGMENT | Points | DUE |
| 1 | What is distance learning | Wiki #1 | 10 | March 10 |
| Presentation | 20 |  |
| 2 | History and theories | Brief paper | 20 | March 24 |
| Spring break | | | | |
| 3 | Distance learners | Discussion 1 | 10 | April 7 |
| Group project | 50 | April 14 |
| 4 | Media selection | Blog #1 | 10 | April 21 |

## 4) Ozone hole



Ozone depletion describes two related phenomena observed since the late 1970s: a steady decline of about four percent in the total amount of ozone in Earth's stratosphere (the ozone layer), and a much larger springtime decrease in stratospheric ozone around Earth's polar regions.[1] The latter phenomenon is referred to as the ozone hole. There are also springtime polar tropospheric ozone depletion events in addition to these stratospheric phenomena.

The main cause of ozone depletion and the ozone hole is man-made chemicals, especially man-made halocarbon refrigerants, solvents, propellants, and foam-blowing agents (chlorofluorocarbon (CFCs), HCFCs, halons), referred to as ozone-depleting substances (ODS). These compounds are transported into the stratosphere by the winds after being emitted at the surface.[2] Once in the stratosphere, they release halogen atoms through photodissociation, which catalyze the breakdown of ozone (O3) into oxygen (O2).[3] Both types of ozone depletion were observed to increase as emissions of halocarbons increased.

Ozone depletion and the ozone hole have generated worldwide concern over increased cancer risks and other negative effects. The ozone layer prevents most harmful UVB wavelengths of ultraviolet light (UV light) from passing through the Earth's atmosphere. These wavelengths cause skin cancer, sunburn, and cataracts, which were projected to increase dramatically as a result of thinning ozone, as well as harming plants and animals. These concerns led to the adoption of the Montreal Protocol in 1987, which bans the production of CFCs, halons, and other ozone-depleting chemicals.

The ban came into effect in 1989. Ozone levels stabilized by the mid-1990s and began to recover in the 2000s. Recovery is projected to continue over the next century, and the ozone hole is expected to reach pre-1980 levels by around 2075.[4] The Montreal Protocol is considered the most successful international environmental agreement to date.

## 5) Energy

In physics, energy is the quantitative property that must be transferred to an object in order to perform work on, or to heat, the object.[note 1] Energy is a conserved quantity; the law of conservation of energy states that energy can be converted in form, but not created or destroyed. The SI unit of energy is the joule, which is the energy transferred to an object by the work of moving it a distance of 1 metre against a force of 1 newton.

Common forms of energy include the kinetic energy of a moving object, the potential energy stored by an object's position in a force field (gravitational, electric or magnetic), the elastic energy stored by stretching solid objects, the chemical energy released when a fuel burns, the radiant energy carried by light, and the thermal energy due to an object's temperature.

Mass and energy are closely related. Due to mass–energy equivalence, any object that has mass when stationary (called rest mass) also has an equivalent amount of energy whose form is called rest energy (in that frame of reference), and any additional energy (of any form) acquired by the object above that rest energy will increase the object's total mass just as it increases its total energy. For example, after heating an object, its increase in energy could be measured as an increase in mass, with a sensitive enough scale.

Living organisms require available energy to stay alive, such as the energy humans get from food. Human civilization requires energy to function, which it gets from energy resources such as fossil fuels, nuclear fuel, or renewable energy. The processes of Earth's climate and ecosystem are driven by the radiant energy Earth receives from the sun and the geothermal energy contained within the earth.

## 6) My Family